



Legendary Reliability™

**PRODUCT MANUAL
MX28B-PDF
POWER DISTRIBUTION FRAME**



APC DC Network Solutions Inc.
11035 Switzer Avenue
Dallas, TX 75238
800-800-4APC

PART NUMBER 990-9132

REVISION HISTORY

Revision	Date	By	Description
A	26 Jan 2001	JNF	Initial release

TABLE OF CONTENTS

1.	GENERAL INFORMATION	4
1.1	Introduction	4
1.2	Precautions	4
1.3	Inspection Upon Receipt Of Goods	4
1.3.1	General	4
1.3.2	Visible External Damage	4
1.3.3	Concealed Damage	5
1.3.4	Return of Damaged Goods	5
2.	SYSTEM OVERVIEW AND TECHNICAL DESCRIPTION	6
2.1	General System Overview	6
2.2	General System Specifications	6
2.2.1	Input –48 VDC Bus	7
2.2.2	Circuit Breaker Tiers	7
2.2.3	Circuit Breakers	7
2.3	INDICATORS AND ALARMS	8
2.3.1	Meters	8
2.3.2	Alarm Relay	9
3.	INSTALLATION PROCEDURES1	10
3.1	Preparation	10
3.1.1	Recommended Tools	10
3.1.2	Recommended Test Equipment	10
3.1.3	Equipment Inspection	10
3.1.4	Safety Precautions	10
3.1.5	Room/Locations	10
3.1.6	Mounting	11
3.2	Input power connections	11
3.3	DC System Grounding	12
3.4	Circuit Breaker Installation	13
3.5	Load connections	13
4.	CUSTOMER SERVICE AND SUPPORT	14
5.	WARRANTY PROVISIONS	14
5.1	General Provisions	14
5.2	Warranty returns	14
5.3	Warranty Repair or Replacement	15
5.4	EXCLUSIONS AND LIMITATIONS	15

1. GENERAL INFORMATION

1.1. INTRODUCTION

The MX28B Power Distribution Frames (PDF) from APC DC Network Solutions Inc. possesses unique features that make them easy to install, maintain and upgrade.

Sales support for purchases, proposals, after-sales support, etc. is provided by APC DC Network Solutions Inc. sales and service offices.

APC DC Network Solutions Inc. provides nationwide 24 hour, 7 day service response by dialing:

(800) 800- 4APC

This service will answer your call, gather specific service information, and ask a qualified service representative to contact you as quickly as possible (*refer to Section 4*).

APC DC Network Solutions Inc. is Located at 11035 Switzer Avenue, Dallas, Texas, 75238.
Phone: (214) 652-4040; FAX: (214) 342-5027.

1.2. PRECAUTIONS

It is extremely important to read, understand, and strictly follow the proper INSTALLATION PROCEDURES in Section 3. In particular, note the SAFETY PRECAUTIONS in Section 3.1.4:

If any precautions are not clearly understood, or special local codes exist, contact your nearest APC DC Network Solutions Inc. representative or the APC DC Network Solutions Inc. offices at (800) 800- 4APC for clarification.

Also, it is the customer's responsibility to ensure that all applicable federal, state and local regulations and industry guidelines are complied with for correct installation of this power system.

1.3. INSPECTION UPON RECEIPT OF GOODS

1.3.1 General

Precautions have been taken to pack the equipment properly for shipment to ensure safe arrival. However, upon receipt, please inspect the entire shipment, including any boxes or crates, for evidence of damage that may have occurred during transit. Also, confirm that the material received matches the packing slip.

1.3.2 Visible External Damage

It is the responsibility of the person receiving the shipment IMMEDIATELY upon taking delivery (while the carrier representative is still on site) to inventory and inspect all materials against the provided bill of lading or weigh bill.

Please be sure that all items are accounted for, including the number of pallets and the quantity of accessory and/or component boxes. Also note any visible external damage that may have occurred during transit.

If damage has occurred, or the quantity of items is not correct:

- Make a descriptive notation on the delivery receipt **before** signing.
- File a damage report with the carrier that delivered the shipment.

1.3.3 Concealed Damage

Within 15 days of receipt, unpack the power system and equipment received from APC DC Network Solutions Inc. and check for concealed damage. Check the materials received against the detailed packing list to verify the quantity and condition as complete and satisfactory.

Again, note any damage to the internal packing material and/or material shortages.

If damage or shortage is noted:

- Request an inspection by the carrier.
- File a concealed damage claim; and/or
- File a material shortage claim with your APC DC Network Solutions Inc. Representative.

DELAY IN NOTIFYING THE CARRIER MAY RESULT IN LOSS OF RIGHT TO REIMBURSEMENT FOR DAMAGES OR LOSS.

Should you have any questions concerning potential damages or should you experience a lack of cooperation from your carrier, call APC DC Network Solutions Inc. at (800) 800- 4APC.

1.3.4 Return of Damaged Goods

Should equipment be damaged and require return to APC DC Network Solutions Inc. for repair, the APC DC Network Solutions Inc. service representative will provide instructions along with a valid RMA (Returned Material Authorization) number to facilitate return of the damaged goods to the APC DC Network Solutions Inc. repair center.

It is important that proper steps as outlined in Section 1.3.2 and 1.3.3 above are followed carefully. Your APC DC Network Solutions Inc. representative will assist you, if required, in obtaining proper disposition of an initial delivery return issue.

However, a valid RMA number must be obtained before returning any equipment to APC DC Network Solutions Inc.

2. SYSTEM OVERVIEW AND TECHNICAL DESCRIPTION

2.1 GENERAL SYSTEM OVERVIEW

The Power Distribution Frame (PDF) provides for distribution of –48 VDC power through circuit breakers. The PDF consists of a rack with three power distribution cabinets. Each cabinet can hold up to 48 circuit breakers on two separate tiers for a total of 144 breakers.

2.2 SYSTEM SPECIFICATIONS

The system is available in six configurations:

Part Number	Tier Locations	Breakers	Feeds
AAB-0583-01	A,D	48	2 Separate
AAB-0583-02	A,B,D,E	96	4 Separate
AAB-0583-03	A,B,C,D,E,F	144	6 Separate
AAB-0583-11	A,B	48	One
AAB-0583-22	A,B & D,E	96	Two
AAB-0583-33	A,B,C & D,E,F	144	Two

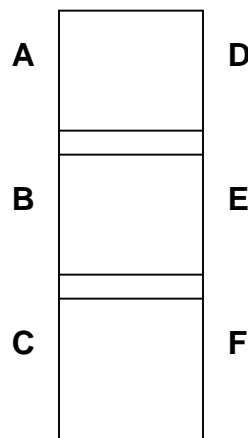


Figure 2-1 System Configurations

2.2.1 Input –48 VDC Bus

All six busses can be isolated, or tied together with splice plates depending on customer desires.

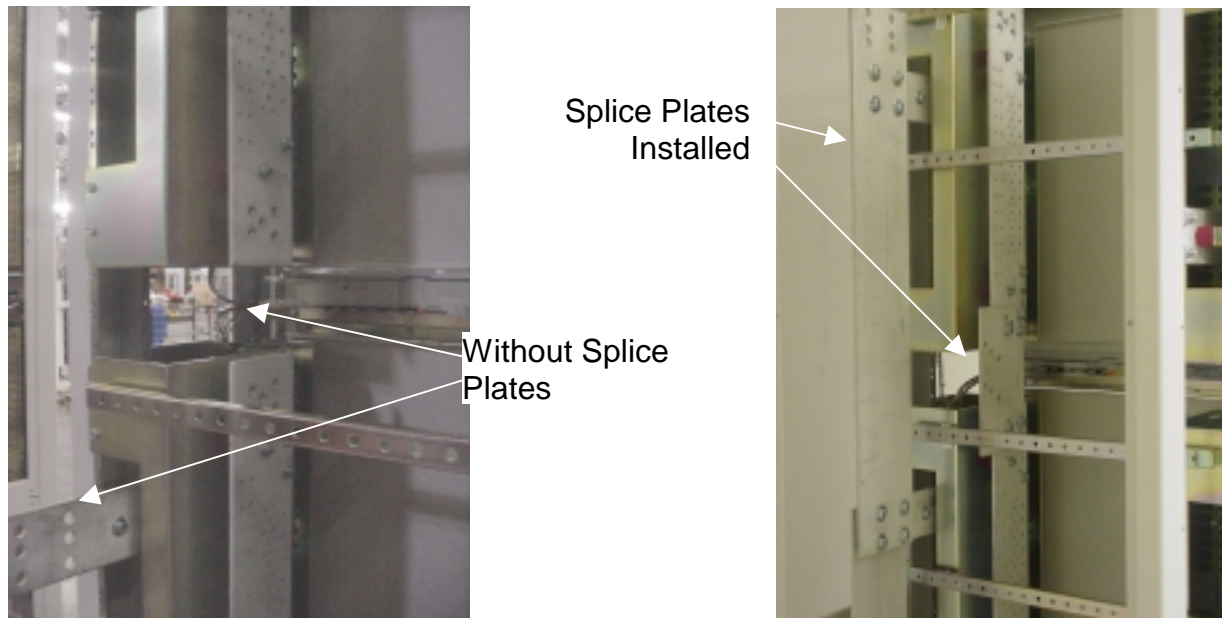


Figure 2-2 Bus Bars

2.2.2 Circuit Breaker Tiers

Each circuit breaker tier provides positions for mounting 24 plug-in circuit breakers. Each tier bus is connected to the –48 VDC input bus with each side having an ampacity of 600 amperes.

2.2.3 Circuit Breakers

The PDF utilizes plug-in magnetic circuit breakers to supply loads from the –48 VDC bus. Each circuit breaker has auxiliary contacts that close if the breaker trips, thus enabling monitoring of fault conditions. Circuit breakers are available with ratings from 1 – 100 amperes (see Table 2-1)

Plug-in circuit breakers rated at 60A or more require two mounting positions. They are available in kit form (see kit selection information in Table 2-2). These kits include the breaker and all necessary mounting hardware.

BREAKER RATING	PART NUMBER		BREAKER RATING	PART NUMBER
1 A	FFA-0014		20 A	FFA-0018
3 A	FFA-0015		30 A	FFA-0019
5 A	FFA-0016		40 A	FFA-0020
10 A	FFA-0017		50 A	FFA-0025
15 A	FFA-0028			

Table2.1 Plug-in Circuit Breakers

	60A	70A	80A	100A
#10 stud 5/8" centers	FFA-0021-1	FFA-0022-1	FFA-0023-1	FFA-0024-1
#10 stud 3/4" centers	FFA-0021-2	FFA-0022-2	FFA-0023-2	FFA-0024-2
1/4" stud 1" centers	FFA-0021-3	FFA-0022-3	FFA-0023-3	FFA-0024-3

Table 2.2 Circuit Breaker kits

2.3 Indicators and Alarms

2.3.1 Meters

The MX28B-PDF power distribution frame has a meter assembly, P/N OM-9275 located below the top cabinet door, for displaying bus voltage and current. A six position rotary switch selects which breaker tier is to be monitored. Voltmeter accuracy is $\pm 0.5\%$; ammeter accuracy is $\pm 1.0\%$. Also displayed are power and circuit breaker trip status.

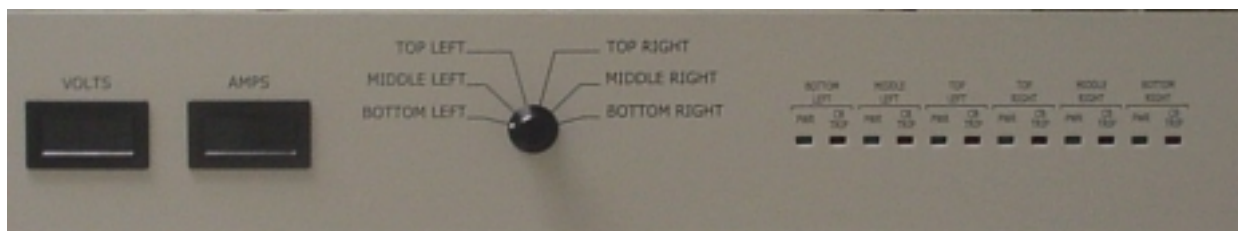


Figure 2-3 Meter Assembly

2.3.2 Alarm Relay

There is an alarm relay, K-1 located on the center of the meter panel that energizes if any circuit breaker trips within the PDF. Form C contacts from this relay are available via connector J-9 located at the center of the circuit board. If the PDF is being powered by an APC MX28B power system, these contacts can be monitored by connecting them to the “external Alarm Inputs” available in the controller

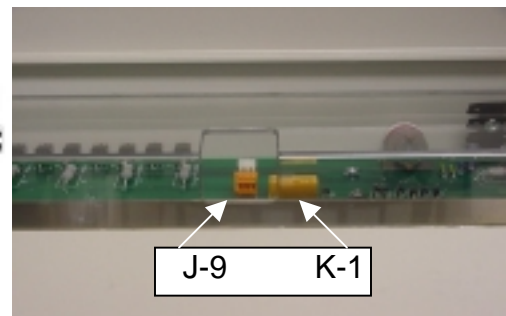
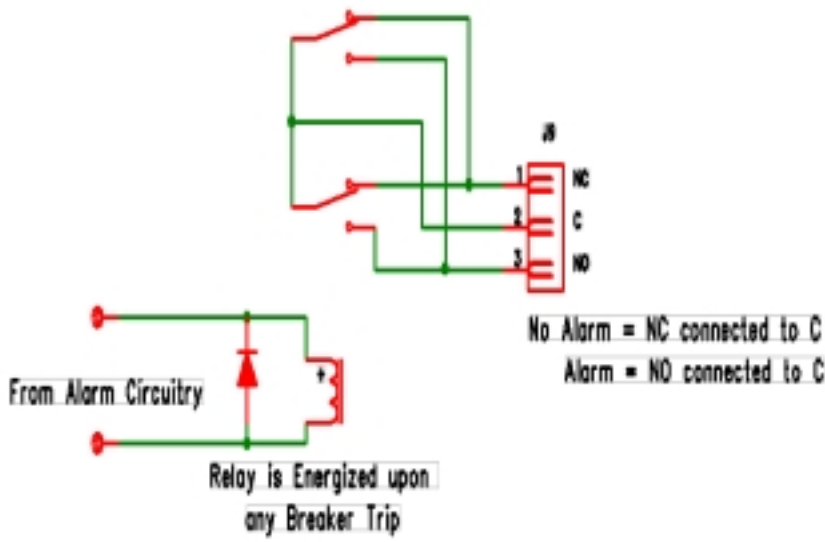


Figure 2-4 Alarm Relay Circuit

MECHANICAL SPECIFICATIONS:

- Dimensions 84" high x 23" wide x 23" deep
- Weight 475 Lbs (approximate)
- Color Dawn Gray

ENVIRONMENTAL:

- Temperature -20°C to +65°C Operating
-40°C to +85°C Storage
- Humidity 0% to 85% non-condensing operating
0% to 95% non-condensing storage
- Altitude Up to 3000 meters operating
Up to 10,000 meters storage

3. INSTALLATION PROCEDURES

3.1 PREPARATION

3.1.1 Recommended Tools

Tools required for installation:

- Standard selection of customary **insulated** hand tools used by qualified technicians.
- An appropriate drill to drill holes in the floor to anchor the plant.
- A crimping device for compressing lugs not already crimped.

3.1.2 Recommended Test Equipment

Test equipment required for installation:

- Digital Multimeter

3.1.3 Equipment Inspection

Remove equipment from packing material and inspect for shipping damage to verify the safety and operational suitability for the installation site. *[Refer to Section 1.3.]*

3.1.4 Safety Precautions

WARNING:

Hazardous energy levels are present on bare conductors in the –48 VDC distribution connection area of the plant. Accidental shorting of distribution conductors can cause arcing and high currents that can cause serious burns or other physical harm.

It is recommended that:

Any jewelry, rings or watches be removed while working on this equipment. Handles of all wrenches, screwdrivers, cutters and pliers be insulated. Shafts of screwdrivers be wrapped in electrical tape or otherwise insulated.

3.1.5 Room/Locations

NOTE: The Power Distribution Frame is to be installed in a room, vault, or similar enclosure that is accessible only to qualified persons in accordance with the NEC (National Electrical Code) or the authority having jurisdiction.

Prior to installation, drawings, floor loading requirements, and grounding schemes should all be verified. Installation drawing number INS-0017 is available from APC DC Network Solutions in Dallas TX.

3.1.6 Mounting

The box frame housing is self-supporting, but designed to be bolted to the floor of the housing structure. The figure below shows the footprint of the box frame and the mounting points with dimensions (shown in inches). Consult the system design specifications to see if it is necessary to electrically isolate the frame from the floor structure. This is required in many installations. Insulator kit, part number AAB-0597 is available if required.

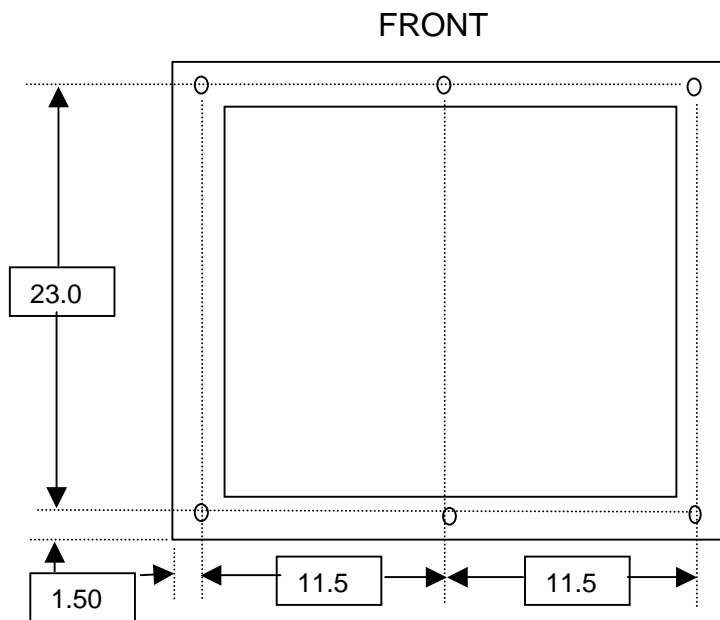


Figure 3-1 Mounting diagram

3.2 INPUT POWER CONNECTIONS

The PDF –48VDC input bus offers multiple connection points for both 1 inch or 1.75 inch on center lugs. The +48VDC return bus has connection points at both the top and bottom for 1 inch and 1.75 inch lugs. If splice plates are used, they also are configured with holes for connection.

3.3 DC SYSTEM GROUNDING

THE POSITIVE LOAD CONNECTION (RETURN BUS) FOR THE POWER DISTRIBUTION FRAME MUST BE CONNECTED TO THE FACILITY MASTER STATION GROUND. DETAILS FOR THIS CONNECTION SHOULD BE PROVIDED IN THE SITE ELECTRICAL GROUNDING PLANS.

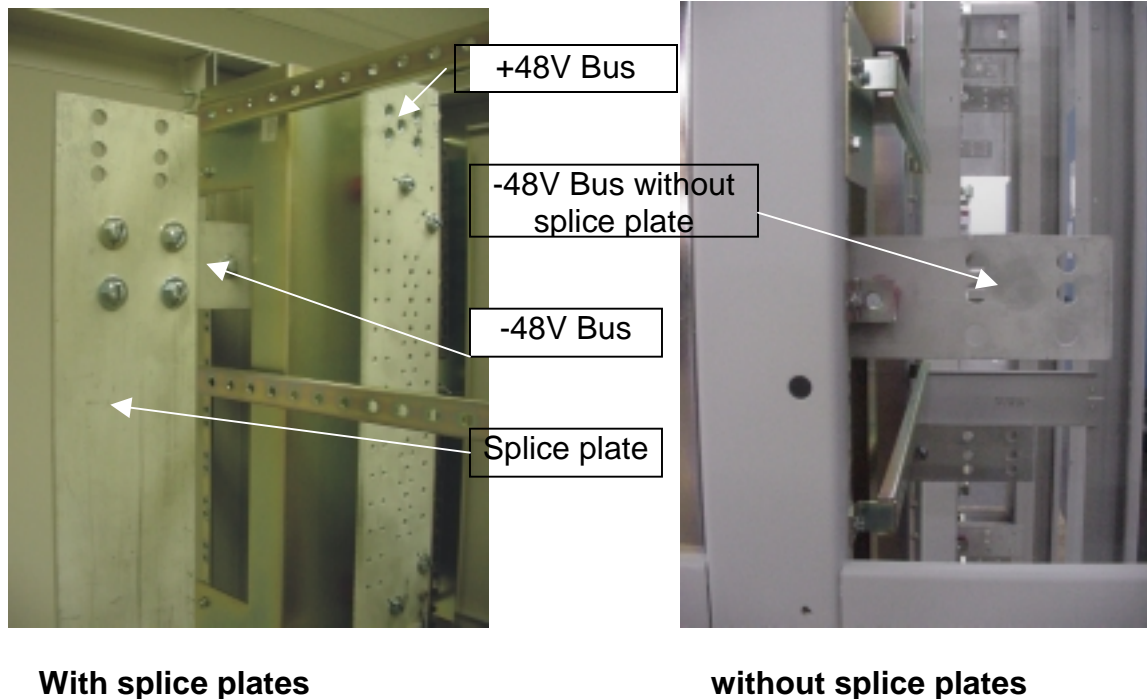


Figure 3-2 Bus Bars

3.4 CIRCUIT BREAKER INSTALLATION

Use diagonal cutters to cut the metal web of the breaker panel “knock-outs” at the desired breaker locations.

Note: Plug-in Breakers (60 A – 100A) require two mounting positions and a breaker adapter kit.

The breakers are installed by snapping the top terminal onto the upper bus bar and rotating the unit down until the second terminal snaps onto the breaker termination post as shown in Figure 3-3. The breaker alarm terminals are designed to make contact with the alarm terminal board as the breaker is snapped into place.

**** **CAUTION** ****

During breaker installation, carefully align the alarm terminals with the alarm terminal board to avoid breaker terminal damage.

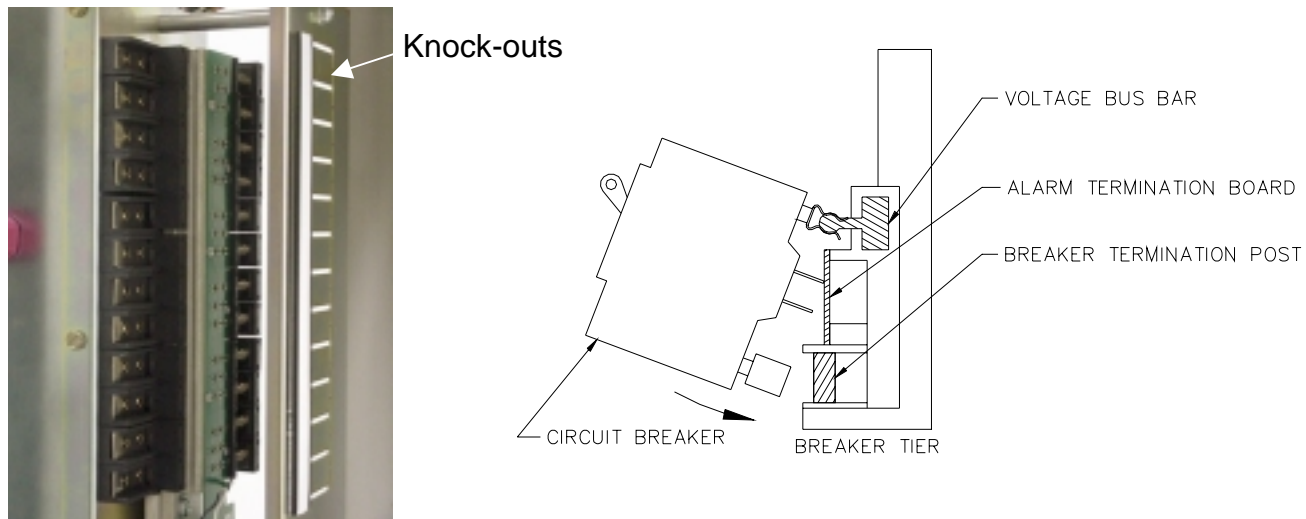


Figure 3-3: Installation of Circuit Breakers

3.5 LOAD CONNECTIONS

Connection for –48VDC loads are made from standard size #10-32 two-hole lugs on 5/8" centers located directly next to the corresponding circuit breaker. The load returns connect to the –48VDC load return bus located behind each row of circuit breakers. The load return bus provides threaded holes for terminating 2-hole lugs. The return bus has provisions for 25 #10-32 lugs on 5/8" centers and 10 ¼"-20 lugs on 1" centers (all pairs can not be used simultaneously). Each DC load run should be bundled with its return for as much of the run length as possible. (Figure 3-4)

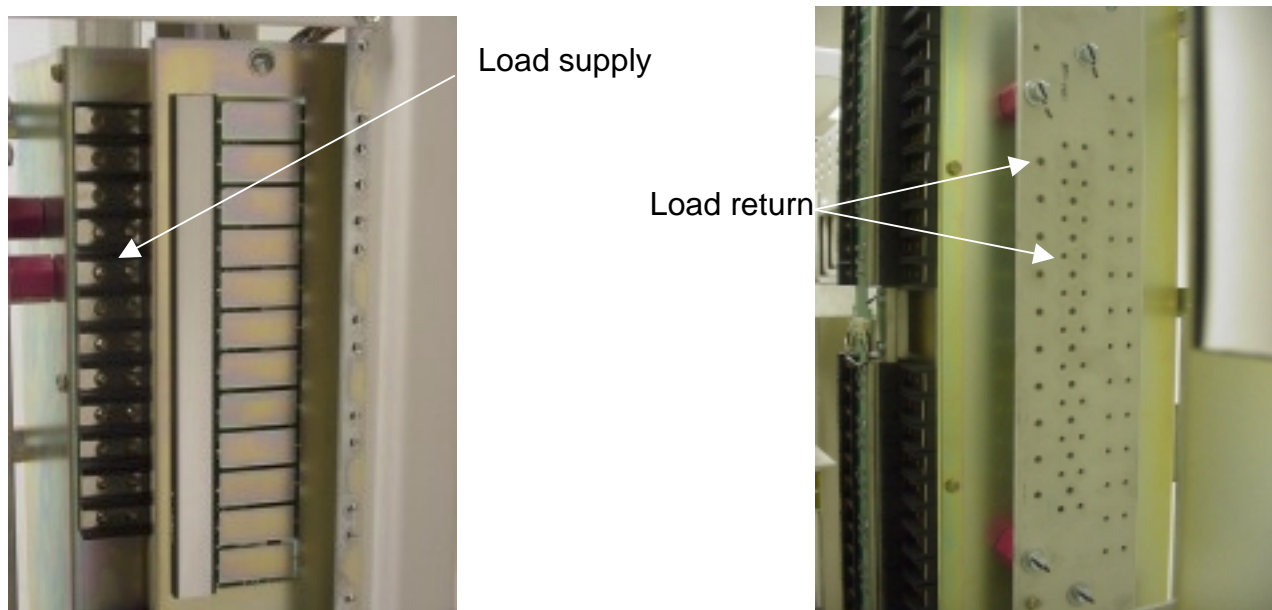


Figure 3-4 load connections

4. CUSTOMER SERVICE AND SUPPORT

APC DC Network Solutions Inc. manufactures the MX28B line of Power Plants and provides customers with complete product and systems support and service. APC DC Network Solutions Inc. has a network of factory trained service technicians. The service organization is on call 24 hours a day, 365 days a year.

If you experience a problem with your APC power system that requires our attention, contact APC DC Network Solutions Inc. at

(800) 800- 4APC.

Units returned for repair can be turned around within 24 to 48 hours of receipt at the factory location. Shipment should be sent pre-paid. The unit will be returned pre-paid, provided it was received that way.

It is important that correct procedures be followed in filing an RMA, including an accurate, written description of the problem. This will aid those actually repairing the unit to do an effective job.

If a unit is returned and a “No Fault Found” results, APC DC Network Solutions Inc. reserves the right to bill the customer for labor and assess a service charge to cover the extra costs incurred.

5. WARRANTY PROVISIONS

5.1 GENERAL PROVISIONS

APC DC Network Solutions Inc. warrants the equipment and components it manufactures or sells against defective materials and workmanship for a period of TWO (2) YEARS from date of shipment.

5.2 WARRANTY RETURNS

If initial physical inspection identifies flaws in material or workmanship that would impair product performance as defined by APC DC Network Solutions Inc. electrical and physical specification as published at the time of shipment, and these flaws are not due to transportation damage or installation abuse, please follow the following procedure:

Contact the nearest APC DC Network Solutions Inc. Service Center, or use our 24 hr emergency number [800-800- 4APC] to request assistance. You will be provided with either:

[1] A Return Material Authorization (RMA) number with instructions for return of the equipment or component(s) to APC DC Network Solutions Inc. factory service center, FOB Destination, Freight Pre-Paid, for examination, or

[2] For non-returnable systems and equipment, notice to wait until an APC DC Network Solutions Inc. Authorized Service Representative arrives at the site to inspect the equipment.

Repaired or Advance Replacement Modules or Circuit Components may be available within 24 to 48 hours of receipt of issuance of an RMA.

5.3 WARRANTY REPAIR OR REPLACEMENT

If, during the warranty period, the supplied equipment is physically or electrically unsound due to defective materials or workmanship on the part of APC DC Network Solutions Inc., the defective product or component(s) will be repaired or replaced at the sole option of APC DC Network Solutions Inc. without charge to the purchaser (user) for replacement materials or factory repair labor. *The procedures outlined above are likewise applicable.* However, costs of replacement installation including, but not limited to, installation equipment, travel expenses of APC DC Network Solutions Inc. Representative(s), and costs of material transportation expenses will be born by the purchaser (user). The replacement product or component(s) shall only complete the remaining unused portion of the original warranty of the replaced product or component(s).

5.4 EXCLUSIONS AND LIMITATIONS

1. This warranty applies only to the original US domestic purchaser (user) and is not transferable internationally, except with expressed written consent from APC DC Network Solutions Inc. headquarters in Dallas, Texas.
2. APC DC Network Solutions Inc. reserves the right to void the warranty if identification marks or serial numbers have been removed or tampered with, or defect is determined to have been caused by misuse, neglect, improper installation, environmental condition, non-authorized repair, alteration or accident.
3. This warranty does not cover physical damage due to the acts of nature or man, which stress the equipment or component(s) beyond design limits and exert undesirable influence aside from normal wear and tear.
4. APC DC Network Solutions Inc. assumes no responsibility for any work accomplished or expenses incurred except with expressed written consent from APC DC Network Solutions Inc., Dallas TX.
5. APC DC Network Solutions Inc. shall not be liable to the purchaser (user) or any other third party, for indirect, incidental, or consequential damages such as, but not limited to, loss of use, loss of profits, costs associated with removal/installation of defective product or component(s) arising out of the sale or relating to the use of this product, and the purchaser (user) assumes responsibility for all personal injury and property damage resulting from the handling, possession or use of the product. In no event shall the liability of APC DC Network Solutions Inc. for any and all claims, including claims for breach of warranty or negligence, exceed the purchase price of the product giving rise to the claim.

THE ABOVE WARRANTY IS IN LIEU OF ALL OTHER REMEDIES, INCLUDING ACTIONS FOR CONTRACT OR NEGLIGENCE. ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE HEREBY EXCLUDED.